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Name of Applicant: Reckitt & Colman Products Limited

Address of Applicant: P.O Box 26, 1/17 Burlington Lane London W. 4.

Actual Inventor: George Nutt & Donald Sidney Adcock

Address for Service: Callinan. Associates, Richmond Victoria

Complete Specification for the invention entitled: "Winemaking"

The following statement is a full description of this invention, including the best method of performing it known to me:—*

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*Note: The description is to be typed in double spacing, pica type face, in an area not exceeding 250 mm in depth and 160 mm in width, on tough white paper of good quality and it is to be inserted inside this form.

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RECKITT & COLMAN PRODUCTS LIMITED

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

COMPLETE SPECIFICATION FOR THE

INVENTION ENTITLED

"Wine-making"

This statement is a full description of this invention, including the best method of performing it known to us:

This invention relates to the manufacture of sherry-style wines.

In the manufacture of sherry-style wines it is necessary to allow young wine to mature or age.

Although the changes occurring during maturation are not fully understood from the chemical standpoint, they are known to be complex and it is known that it is necessary for the maturing wine to be contacted with oxygen. During maturation, growth of yeast takes place with consequent production of acid. The overall change during maturation results in an increase in the concentration of acetaldehyde and acetal present with concomitant reduction in the amount of acid produced.

Conventionally, the wine is matured in wooden casks subsequent to fermentation for a period of years by the so-called solera process. Disadvantages of the solera process are that considerable storage space is required and capital, in the form of maturing wines and casks, is tied up for excessively long periods.

In an attempt to increase production rates, it has been proposed to expose maturing wine, or a blend of maturing wines, to oxygen by bubbling an oxygenated gas, conveniently air, through the maturing wine(s), for example as disclosed in U.S. Patent 2181839 to Tressler. Maturation has been found to occur under these conditions but such a process suffers from the disadvantage that the stream of gas may carry off low-boiling flavour components in which case it is necessary to extract the low-boiling flavour components from the gas stream and, following maturation, to reintroduce them into the wine. This process is therefore troublesome and furthermore, the flavour of the sherry-style wine thereby produced has been found to be not entirely satisfactory since flavour components removed from the wine are unable to participate in the complex changes undergone by the wine during maturation.

The present invention is based on the discovery that the maturation period necessary in the production of sherry-style wines of acceptable flavour from young wine or must may be considerably shortened if the young wine or must is allowed to mature whilst in contact with a

plastics material at least partially permeable to oxygen whereby oxygen permeates into the young wine or must whilst maturation proceeds. By the term "must" as used herein is meant unfermented or partially fermented fruit-juice including yeast, e.g. grape-juice. The must may optionally additionally contain added sugar, yeast nutrients, anti-foam agents and/or other additives conventionally used in wine-making.

According to the present invention there is thus provided a process for the production of a sherry-style wine wherein young wine or must containing a suitable yeast is stored in contact with an oxygen-permeable plastics material and oxygen is allowed to permeate into the young wine or must through the said plastics material, storage being effected for a period of time sufficient to produce a sherry-style wine. The term "oxygen-permeable plastics material" is used herein to mean a material which permits permeation of oxygen therethrough whereby oxygen can be brought into contact with the young wine or must but does not include materials

having a permeability sufficiently great, under the conditions prevailing in the process, to allow ingress of oxygen into the young wine or must in the form of bubbles.

Maturation is conveniently effected at a temperature of from 10°C to 40°C., and is preferably effected at a temperature of from 15 to 30°C, the optimum temperature range being 18 to 22°C.

The source of oxygen will generally be atmospheric air and thus, for example, maturation in accordance with the present invention can conveniently be effected by storing young wine or must in a vessel of oxygen-permeable plastics material, the said vessel being in external contact with the atmosphere. If desired, however, the vessel of plastics material may be surrounded by a jacket through which pure oxygen or oxygen-enriched air, at atmospheric or higher pressure, may be passed.

The oxygen-permeable plastics material may, for example, be low-density polyethylene, for example polyethylene of density 0.80 to 1.05 g/cm^3, preferably 0.90 to 0.94 g/cm^3 and more preferably 0.91 to 0.93 g/cm^3 but

polyethylene of higher or lower density may if desired be used. If polyethylene of higher density is used, regard must be taken of its relatively lower permeability to oxygen. If polyethylene of lower density is used, it is necessary to ensure that the resulting material has sufficient strength.

When plastics materials other than polyethylene are used, they preferably have a permeability to oxygen which is at least as high as low density polyethylene having a density of 1.05 g/cm^3. Advantageously such plastics materials will have a permeability to oxygen which is equivalent to that of low density polyethylene having a density of from 0.80 to 1.05, especially 0.90 to 0.94 and more especially 0.91 to 0.93 g/cm^3.

Preferably the ratio of the surface area of the oxygen-permeable plastics material in contact with the young wine or must to the volume of young wine or must will be from 1 cm^2: 0.25 cm^3 to 1 cm^2:25 cm^3, advantageously 1 cm^2:2.5 cm^3 to 1 cm^2:12.5 cm^3.

The oxygen-permeable plastics material may either be self-supporting or may be supported on or in a suitable framework such as unglazed porcelain or Alundum (a material made by fusing alumina in an electric furnace) or may be coated onto a suitable supporting fabric such as hessian or mutton cloth.

The thickness of the oxygen-permeable plastics material may vary within wide limits, depending at least in part on the density of the material and whether it is intended to be self-supporting or not. Generally, the oxygen-permeable material will range from 0.0002 inch (0.005 mm) to 0.25 inch (6.4 mm) in thickness; preferably the said thickness will be 0.0008 inch (0.02 mm) to 0.1 inch (2.5 mm) and advantageously 0.001 inch (0.025 mm) to 0.05 inch (1.3 mm).

In one embodiment of the process of the present invention, must is subjected to simultaneous fermentation and maturation in the presence of a yeast known to effect both processes. Examples of such yeasts are Sacromyces oviformis, S.Beticus, and S. cheresiensis, these being yeasts which under suitable conditions can give rise to sherry flor. Alternatively, must may first

be fermented to yield a young wine in conventional manner and the young wine thus produced, or a blend of such young wines, may then be subjected to maturation in accordance with the present invention, for example in the presence of a yeast of the type discussed above.

As hereinbefore discussed, the young wine or must may be matured in individual containers constructed of the oxygen-permeable plastics material and thus, for example, for small-scale wine production,e.g. as practised in the home, it is convenient to use small containers made of an appropriate oxygen-permeable plastics material. Similarly for large scale wine production, vats made of an appropriate oxygen-permeable plastics material can be used. For large-scale wine-production, however, it may be desirable to pass the young wine or must through a series of pipes of the oxygen-permeable plastics material during maturation so as to ensure that a sufficiently large surface-area of the wine or must is allowed to contact an oxygenated gas, generally the atmosphere, via the oxygen-permeable

material. Alternatively, the young wine or must may be matured in individual containers and to ensure sufficient oxygen-contact, the oxygenated gas may be circulated within the wine or must through tubes of oxygen-permeable plastics material.

If desired, the matured wine may subsequently be fortified, for example with brandy.

For a better understanding of the present invention, reference is made to the accompanying drawings wherein:-

Fig. 1 shows a vessel constructed of oxygen-permeable plastics material in accordance with the present invention, the said vessel being in direct external contact with the atmosphere;

Fig. 2 shows a vessel similar to Fig. 1 but surrounded by a jacket through which oxygen or an oxygen-containing gas may be passed; and

Fig. 3 shows a vessel constructed of thicker plastics material than those shown in Figs. 1 and 2.

In Figure 1, the oxygen-permeable vessel consists of a tube 1 of low density polyethylene of thickness 0.0035

inch (0.089 mm) and density 0.86 g/cm^3. The tube is supported on a base 2 by means of a retort stand 3 and has an internal diameter of 4.5 inch (11.4 cm) and a capacity of 1.1 Imperial gallons (5 litres). The vessel is sealed by means of an elastic band 4.

In Figure 2, a vessel similar to that of Figure 1 but sealed at the top is surrounded by a jacket 5 through which oxygen may be passed via inlet 6 and outlet 7.

Figure 3 shows a larger-scale vessel 8 supported by a wall-mounted ring 9 and diamond-shaped open mesh tubular support 10. The vessel has a capacity of 50 Imperial gallons (227 litres) and an internal diameter of 11 5/8 inches (29.5 cms). The vessel is constructed of polyethylene of density 0.87 g/cm^3 and thickness 0.005 inch (0.13 mm).

It has been found that the rate of sherry flor film formation on the surface of wine maturing in accordance with the present invention is considerably greater than takes place when wine is matured, after completion of primary fermentation, in comparable glass vessels.

The present invention enables sherry-style wines to be conveniently and relatively rapidly matured and the following Examples illustrate the process of the present invention on the small scale and in large-scale wine production.

Example 1

The following ingredients were placed in a 1 Imperial gallon (4.5 litres) container of polyethylene of density 0.92 g/cm^3 and wall thickness 0.05 inch (1.3 mm):

675 ml Grape Concentrate Special White

343.2 g Sugar

5 g Sacromyces oviformis

0.1 g Silicone anti-foaming agent

3.42 l Water.

The ratio of the container surface area in contact with the must to the must volume was 1 cm^2:3.7 cm^3.

The container was fitted with a fermentation lock and the mixture was allowed to ferment for 5 days.

A further 56.7 g of sugar were added and the mixture was allowed to ferment for a further 5 to 7 weeks following which 3 Campden tablets (sufficient to give an SO_2

concentration of approximately 150 ppm when added to 1 Imperial Gallon (4.5 litres) of liquid were added to effect sterilisation and 568 g of sugar were added to sweeten the wine.

The wine was allowed to stand for 4 weeks for suspended matter to settle and was then bottled. Although the wine produced was at this point acceptable in flavour, the flavour was improved by leaving the wine in the bottle for approximately 1 month prior to drinking.

Example 2

An open-topped right cylindrical vessel made from sterile film polyethylene of density 0.86 g/cm^3 and thickness 0.0035 inch (0.089 mm) (supplied by British Visqueen Limited) was supported on a retort stand as shown in Fig. 1 of the accompanying drawings.

A concentrated Argentinian white grape juice was diluted to 5 litres giving a must of 22.5% Brix. The ratio of the container surface area in contact with the must to the must volume was 1 cm^2:3 cm^3. A Jerez flor yeast was distributed in the diluted juice to provide a starting cell count of 20 x 10^6 per ml.

The must was charged to the vessel, the top of which was closed by means of an elastic band, and was allowed to ferment at 21°C in contact with the surrounding atmosphere, via the polyethylene film, for 21 days at which time the acetaldehyde concentration was found to be 120 ppm. The fermenting wine was allowed to stand for a further 14 days. Flor development, as islets of flor, was noticeable after 28 days of fermentation. After 35 days from commencement of fermentation, at which time the aldehyde content was found to be 300 ppm and the alcohol content was found to be 14% by volume, the wine was racked and bottled. In flavour, appearance and bouquet, the product resembled a light "Fino" sherry-style wine.

It will be appreciated that the above process can readily be scaled-up for industrial production.

The claims defining the invention are as follows:

1. A process for the production of a sherry-style wine wherein young wine or must containing a suitable yeast is stored in contact with an oxygen-permeable plastics material (as herein defined) and oxygen is allowed to permeate into the young wine or must through the said plastics material, storage being effected for a period of time sufficient to produce a sherry-style wine.

2. A process as claimed in claim 1 wherein the said plastics material is low density polyethylene or another plastics material having a permeability to oxygen which is at least as high as that of low density polyethylene having a density of 1.05 g/cm^3.

3. A process as claimed in claim 2 wherein the said plastics material has a permeability to oxygen which is equivalent to that of low density polyethylene having a density of from 0.80 to 1.05 g/cm^3.

4. A process as claimed in claim 3 wherein the said plastics material is polyethylene having a density of from 0.91 to 0.93 g/cm^3.

5. A process as claimed in any of the preceding claims wherein the thickness of the said plastics material is from 0.005 mm to 6.4 mm.

6. A process as claimed in any of the preceding claims wherein the said yeast is Sacromyces oviformis, Sacromyces beticus or Sacromyces cheresiensis.

7. A process as claimed in any of the preceding claims wherein the ratio of the surface area of the said plastics material in contact with the said young wine or must to the volume of young wine or must is from 1 cm^2: 0.25 cm^3 to 1 cm^2:25 cm^3.

8. A process for the production of a sherry-style wine substantially as herein described in Example 1 or Example 2.

9. A sherry-style wine when produced by a process as claimed in any of the preceding claims.

10. Each and every novel process, method, feature, step, product, apparatus and its integers, substantially as herein described and/or illustrated.

D A T E D this 23rd day of July 1974.

RECKITT & COLMAN PRODUCTS LIMITED
By its Patent Attorneys:
CALLINAN AND NEWTON

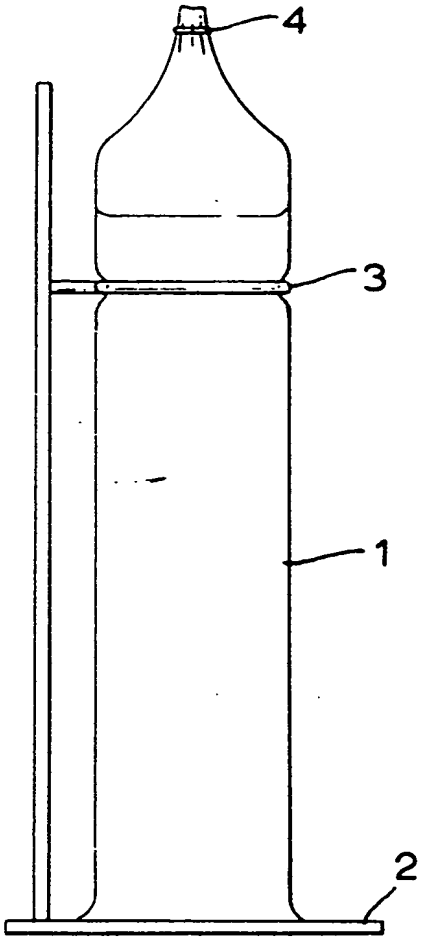

FIG.1.

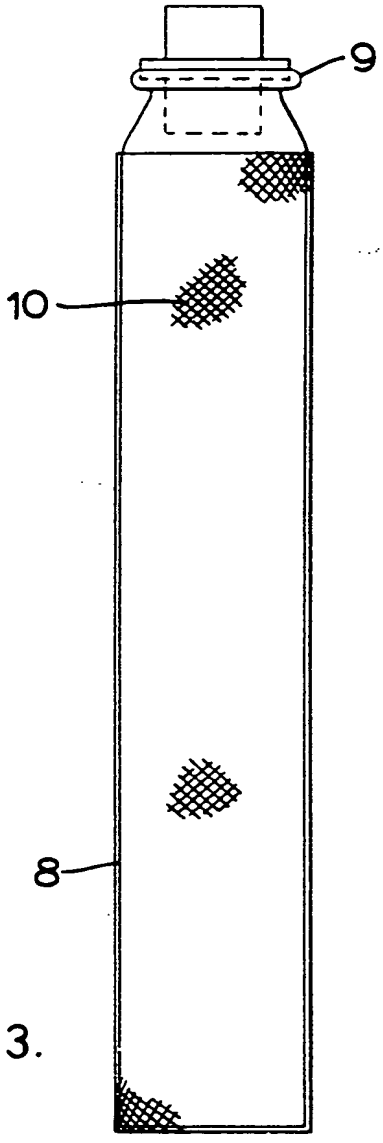

FIG.3.

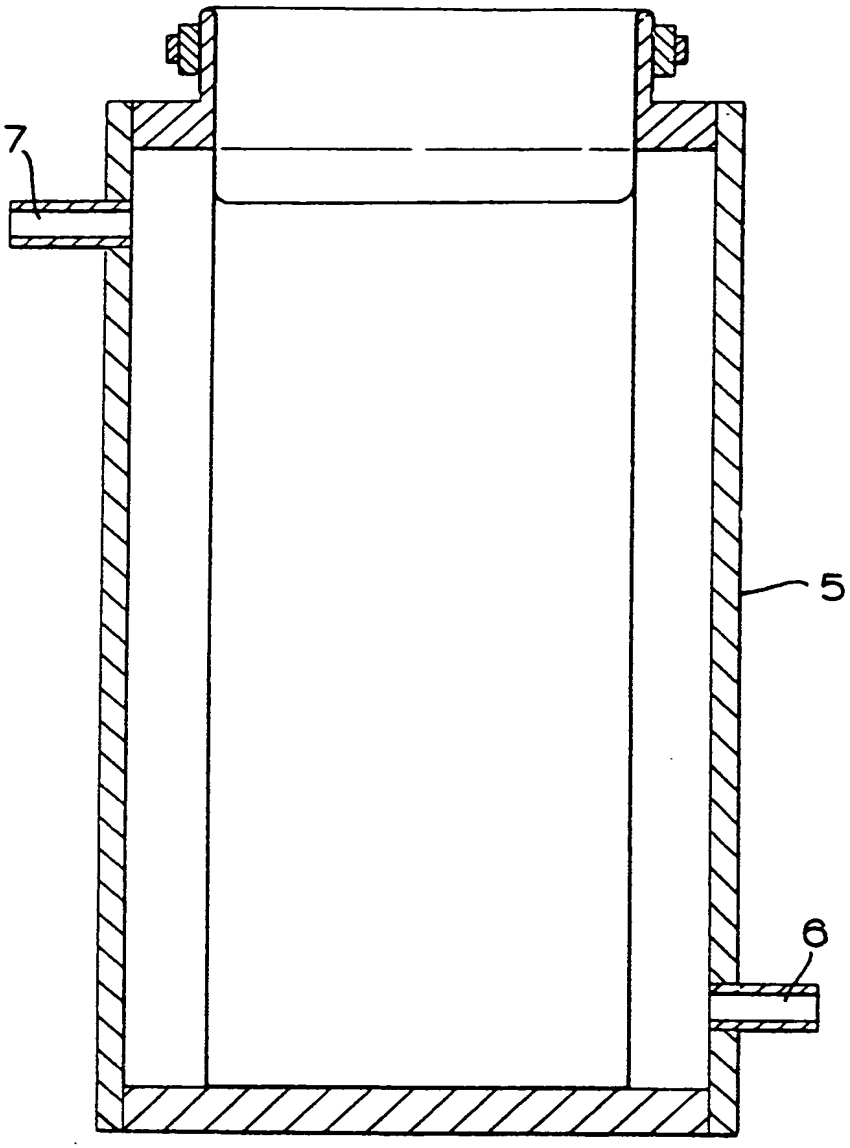

FIG. 2.

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